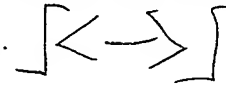


user is used to chewing; the ball is not displaced all around inside the mouth leaving several places excluded from the cleaning action of the ball.



This being the situation it would be highly desirable to have an improved tooth-cleaning device overcoming or at least partially limiting the drawbacks of the prior art.

SUMMARY OF THE PRESENT INVENTION

Generally, the present invention is directed to an handless cleaning device which can be easily displaced all around inside the mouth, thus allowing excellent cleaning results to be obtained.

In particular, the tooth-cleaning device according to the present invention allows dental plaque to be efficiently removed and/or prevented.

Moreover, the tooth-cleaning device of the present invention allows teeth to be cleaned while exploiting daily activities and is therefore of practical use and not time consuming.

Additionally, the inventive tooth-cleaning device does not require the use of hands and/or arms and can therefore conveniently be used by disabled people with not upper body mobility.

The tooth-cleaning device of the present invention does not require water and can be discarded once the cleaning process has been completed.

Finally, the tooth-cleaning device according to the present invention can be shaped so as to meet the particular requirements of the user. The user can select the most preferred shape allowing the tooth-cleaning device to be efficiently displaced all around inside the mouth. The shape can even be modified during the cleaning process, allowing the user to exploit different cleaning purposes during a single cleaning process.

For this purpose, according to a first embodiment as claimed in claim 1, the present invention relates to a tooth-cleaning device comprising a main body and a plurality of

< Another example of a tooth-cleaning device adapted to be displaced within the mouth.

bristles carried by said main body, wherein the tooth-cleaning device comprises engaging means adapted to be engaged by the tongue and allowing said tooth-cleaning device to be displaced within the mouth by means of the tongue.

According to a preferred embodiment as claimed in claim 4, the main body of the tooth-cleaning device of the present invention is a hollow body comprising an inner cavity defining a receiving portion adapted to receive at least a portion of the tongue.

In another preferred embodiment as claimed in claim 8, the main body of the tooth-cleaning device of the present invention defines a through hole.

According to a still preferred embodiment as claimed in claim 9, said main body has a ring or doughnut shape.

In another preferred embodiment as claimed in claim 17, the present invention relates to a tooth-cleaning device comprising a main body and a plurality of bristles carried by said main body, wherein said main body is deformable so that it can be shaped so as to form engaging means adapted to be engaged by the tongue and allowing said tooth-cleaning device to be displaced within the mouth by means of the tongue.

In particular, according to the preferred embodiment of the present invention as claimed in claim 20, the main body of the tooth-cleaning device comprises a flat strip adapted to be deformed so as to define a receiving portion adapted to receive at least a portion of the tongue.

According to the further preferred embodiments as claimed in one of claims 21 to 23, said flat strip can be deformed into a body having approximately a cylindrical shape, a thimble shape or a spherical shape.

In a still preferred embodiment as claimed in claim 24, the main body of the tooth-cleaning device according to the present invention comprises an elongated body of an approximately barret-like shape .

For example, said elongated main body can be deformed into an approximately ring shaped or doughnut shaped body, or into an approximately square shaped body or a polygonal-like shaped body with a predefined number of sides.

According to the still preferred embodiment as claimed in claim 34, the main body of the tooth-cleaning device of the present invention is adapted to receive a dispersible substance which is naturally dispersed during use.

Preferably, said dispersible substance can be selected between a flavoring substance or a toothpaste or a therapeutic substance.

According to a further preferred embodiment as claimed in claim 36, the main body of the tooth-cleaning device of the present invention is filled with a liquid dispersible substance which is released, during use, through small passages provided in said body.

Alternatively, according to the embodiment as claimed in claims 37, the main body of the tooth-cleaning device of the present invention is impregnated with said dispersible substance.

In another preferred embodiment as claimed in claim 38, the main body of the tooth-cleaning device of the present invention is formed by a resilient material and a string or cord is provided to be hand-held by the user, thus preventing accidental ingestion of the tooth-cleaning device. Preferably, said resilient material is selected between gum, silicon or resin.

Additionally, according to the still preferred embodiment as claimed in claim 40, the main body of the inventive tooth-cleaning device is inert, non-toxic and impervious to saliva.

According to another preferred embodiment as claimed in claim 41, adhesion improving means are provided to improve the adhesion of the tongue to the main body. Preferably, said additional improving means comprise resilient protrusions extending from the main body.

According to a further preferred embodiment as claimed in claim 45, the tooth-cleaning device of the present invention is embedded in a sweet or a drop or the like of a dispersible material adapted to be dissolved by the human saliva and/or by chewing.

Other preferred embodiments of the tooth-cleaning device according to the present invention are defined in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages, objects and features of the present invention are defined in the appended claims and will become more apparent with the following detailed description when taken with reference to the accompanying drawings in which identical or corresponding parts are identified by the same reference numerals. In particular, in the drawings:

Figures 1a to 1f relates to a ring or doughnut shaped tooth-cleaning device according to a first embodiment of the present invention;

In Figures 2a to 2d there are depicted some preferred shapes of the main body of the tooth-cleaning device of the present invention;

Figures 3a to 3d relate to further preferred embodiments of the tooth-cleaning device of the present invention;

Figures 4a to 4d represent corresponding embodiments of the tooth-cleaning device of the present invention wherein the main body has a hollow spherical shape;

Figures 5a to 5d relate to a further embodiment of the present invention wherein the main body comprises a deformable, elongated barret-like main body;

In Figures 6a to 6d there are depicted some preferred cross-sectional shapes of the elongated barret-like main body of Figures 5a to 5d;

Figures 7a to 7d relate to a further embodiment of the tooth-cleaning device of the present invention wherein the main body comprises a deformable flat strip;

CLAIMS

1. A tooth-cleaning device (1) comprising a main body (2) and a plurality of bristles (3) carried by said main body,

said tooth-cleaning device ~~being characterized in that~~ it comprises engaging means (4, 7) adapted to be engaged by the human tongue and allowing said tooth-cleaning device to be displaced within the mouth by means of the tongue,
2. A tooth-cleaning device as claimed in claim 1, **characterized in that** said engaging means comprise a receiving portion (4, 7) adapted to receive at least a portion of the tongue, allowing said tooth-cleaning device to be displaced within the mouth by means of the tongue.
3. A tooth-cleaning device as claimed in claim 2, **characterized in that** said receiving portion comprises a receiving aperture (4) adapted to receive at least the end portion of the tongue, allowing the tooth-cleaning device to be displaced within the mouth by means of the tongue.
4. A tooth-cleaning device as claimed in claim 3, **characterized in that** said main body is a hollow body comprising an inner cavity (7) defining said receiving portion, with said inner cavity communicating with the exterior through said receiving aperture.
5. A tooth-cleaning device as claimed in claim 4, **characterized in that** said hollow body has an approximately hollow cylindrical shape, defining an approximately cylindrical receiving portion.
6. A tooth-cleaning device as claimed in claim 4, **characterized in that** said main body has an approximately hollow thimble shape defining a tapered receiving portion.
7. A tooth-cleaning device as claimed in claim 4, **characterized in that** said main body has an approximately spherical hollow shape defining an approximately spherical receiving portion.

8. A tooth-cleaning device as claimed in claim 3, **characterized in that** said main body defines a trough hole (4) corresponding to said receiving aperture.
9. A tooth-cleaning device as claimed in claim 8, **characterized in that** said main body has an approximately ring or doughnut shape.
10. A tooth-cleaning device as claimed in claim 8, **characterized in that** said main body has an approximately square shape.
11. A tooth-cleaning device as claimed in claim 8, **characterized in that** said main body has an approximately polygonal shape with a predefined number of sides.
12. A tooth-cleaning device as claimed in one of claims 8 to 11, **characterized in that** said main body has a cross sectional shape approximately circular.
13. A tooth-cleaning device as claimed in claim 8 to 11, **characterized in that** said main body has an approximately square cross sectional shape.
14. A tooth-cleaning device as claimed in one of claims 8 to 11, **characterized in that** said main body has an approximately polygonal cross sectional shape with a predefined number of sides.
15. A tooth-cleaning device as claimed in one of claims 8 to 11, **characterized in that** said main body comprises a cylindrical surface (5) facing said through hole.
16. A tooth-cleaning device as claimed in claim 15, **characterized in that** said main body has a cross-sectional contour defined by a linear portion and a curved portion joined to said linear portion.
17. A tooth-cleaning device (1) comprising a main body (2) and a plurality of bristles (3) carried by said main body, said tooth-cleaning device being **characterized in that** said main body (2) is deformable so that it can be shaped so as to form engaging means (4, 7) adapted to be engaged by the human tongue and allowing said tooth-cleaning device to be displaced within the mouth by means of the tongue.

18. A tooth-cleaning device as claimed in claim 17, **characterized in that** said main body can be deformed so as to define a receiving portion (4, 7) adapted to receive at least a portion of the tongue, allowing said tooth-cleaning device to be displaced within the mouth by means of the tongue.
19. A tooth-cleaning device as claimed in claim 18, **characterized in that** said main body can be deformed so as to define a receiving portion comprising a receiving aperture (4) adapted to receive at least the end portion of the tongue, allowing the tooth-cleaning device to be displaced within the mouth by means of the tongue.
20. A tooth-cleaning device as claimed in claim 19, **characterized in that** said main body comprises a flat strip adapted to be deformed so as to define said receiving portion.
21. A tooth-cleaning device as claimed in claim 20, **characterized in that** said flat strip can be deformed into a body of an approximately cylindrical shape, defining an approximately cylindrical receiving portion.
22. A tooth-cleaning device as claimed in claim 20, **characterized in that** said flat strip can be deformed into a body of an approximately thimble shape defining a taper receiving portion.
23. A tooth-cleaning device as claimed in claim 19, **characterized in that** said flat strip can be deformed into a body of an approximately spherical shape defining an approximately spherical receiving portion.
24. A tooth-cleaning device as claimed in claim 19, **characterized in that** said main body comprises an elongated body of an approximately barrel-like shape, adapted to be deformed so as to define a through hole (4).
25. A tooth-cleaning device as claimed in claim 24, **characterized in that** elongated body can be deformed into an approximately ring-shaped or doughnut-shaped body.
26. A tooth-cleaning device as claimed in claim 24, **characterized in that** said elongated body can be deformed into an approximately square-shaped body.

27. A tooth-cleaning device as claimed in claim 24, **characterized in that** said elongated body can be deformed into an approximately polygonal shaped body with a predefined number of sides.
28. A tooth-cleaning device as claimed in one of claims 24-27, **characterized in that** said elongated body has a cross-sectional shape approximately circular.
29. A tooth-cleaning device as claimed in one of claims 24-27, **characterized in that** said elongated body has an approximately square cross-sectional shape.
30. A tooth-cleaning device as claimed in one of claims 24-27, **characterized in that** said elongated body has an approximately polygonal like cross-sectional shape with a predefined number of sides.
31. A tooth-cleaning device as claimed in one of claims 24-27, **characterized in that** said elongated body comprises a flat surface (5).
32. A tooth-cleaning device as claimed in claim 31, **characterized in that** said elongated body has a cross-sectional contour defined by a linear portion and a curved portion (5') joined to said linear portion.
33. A tooth-cleaning device as claimed in one of claims 1-32, **characterized in that** said main body comprises a contact area adapted to be contacted by the tongue, with said bristles being provided outside said contact area.
34. A tooth-cleaning device as claimed in one of claims 1-33, **characterized in that** said main body is adapted to receive a dispersible substance which is naturally dispersed during use.
35. A tooth-cleaning device as claimed in claim 34 **characterized in that** said dispersible substance is selected between a flavoring substance, a toothpaste, or a therapeutical substance.
36. A tooth-cleaning device as claimed in one of claims 34-35 **characterized in that** said main body is filled with a liquid dispersible substance which is released, during use, through small passages provided in said body.

37. A tooth-cleaning device as claimed in one of claims 34-35, **characterized in that** said body is impregnated with said dispersible substance.
38. A tooth-cleaning device as claimed in one of claims 1-37, **characterized in that** said main body is formed by a resilient material and a string or cord is provided to be hand-held by the user, thus preventing accidental ingestion of the tooth-cleaning device..
39. A tooth-cleaning device as claimed in claim 38, **characterized in that** said resilient material is selected between gum, silicon, or resin.
40. A tooth-cleaning device as claimed in one of claims 1-39, **characterized in that** said body is inert, non-toxic and impervious to saliva.
41. A tooth-cleaning device as claimed in one of claims 1 to 40, **characterized in that** said main body comprises adhesion improving means (8) adapted to improve the adhesion of the tongue to the main body.
42. A tooth-cleaning device as claimed in claim 41, **characterized in that** said adhesion improving means comprise resilient protrusions extending from said main body.
43. A tooth-cleaning device as claimed in one of claims 1 to 42, **characterized in that** said bristles comprise bristles of at least two different lengths.
44. A tooth-cleaning device as claimed in one of claims 1 to 43, **characterized in that** said bristles comprise bristle tufts.
45. A tooth-cleaning device (1) as claimed in one of claims 1-44, **characterized in that** said main body (2) and said bristles are at least partially embedded in a sweet or a drop (9) of a dispersible substance adapted to be dispersed by the human saliva.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 02/04544

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A46B5/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A46B A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 252 710 A (FOREMAN RICHARD AIKEN) 13 January 1988 (1988-01-13) the whole document	1-4, 6, 8-20, 22, 24-30, 33-35, 40-45
X	US 4 292 705 A (STOUFFER JAMES F) 6 October 1981 (1981-10-06) the whole document	1-5, 8-21, 24-30, 33-35, 37, 40, 43-45

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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- *P* document published prior to the International filing date but later than the priority date claimed

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- *X* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 100 33 849 A (JACOBS HARTNUT) 25 January 2001 (2001-01-25) the whole document	1-4, 7-20, 23-30, 33-35, 40, 43-45
A	GB 2 162 743 A (YUEH WEI YI) 12 February 1986 (1986-02-12) the whole document	1-45

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/04544

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 100 33 849 A (JACOBS HARTMUT) 25 January 2001 (2001-01-25) the whole document	1-4, 7-20, 23-30, 33-35, 40, 43-45
A	GB 2 162 743 A (YUEH WEI YI) 12 February 1986 (1986-02-12) the whole document	1-45

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/EP 02/04544

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